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Let F be the vector space of functions $\mathbf{R} \rightarrow \mathbf{R}$.
For each of the following functions $T : F \rightarrow F$

1. Determine whether or not T is linear.
2. If it is linear,
 - (a) describe $\text{Ker}(T)$, and
 - (b) determine whether or not T is invertible.
1. $T(f) = f - 1$, regarding 1 as the constant function $1(x) = 1$.
2. $T(f) = f - f(0)$, regarding $f(0)$ as a constant function.